National Climatic Data Center

DATA DOCUMENTATION

FOR

DATA SET 6351 (DSI-6351)

INTEGRATED GLOBAL RADIOSONDE ARCHIVE (V1.0)

January 6, 2006

By Imke Durre

National Climatic Data Center
151 Patton Ave.
Asheville, NC 28801-5001 USA

Table of Contents

Topic	Page Number
1. Abstract	3
2. Element Names and Definitions	3
3. Start Date	7
4. Stop Date	7
5. Coverage	7
6. How to order data	7
7. Archiving Data Center.	7
8. Technical Contact	7
9. Known Uncorrected Problems	8
10. Quality Statement	8
11. Essential Companion Data Sets	8
12. References	8

1. Abstract: The Integrated Global Radiosonde Archive (IGRA) consists of radiosonde and pilot balloon observations at over 1500 globally distributed stations. Observations are available for standard, surface, tropopause and significant levels. Variables include:

Pressure
Temperature
Geopotential Height
Dewpoint Depression
Wind Direction
Wind Speed

The period of record varies from station to station, with many extending from 1970 to present. Station records are updated daily and are available online at no charge.

IGRA data originate from 11 different sources and have passed through a set of rigorous quality assurance procedures. Details on the processing and quality assurance procedures can be found in the references listed at the end of this documentation. Further information, including relevant metadata, is also available at www.ncdc.noaa.gov/oa/cab/igra/index.php.

2. Element Names and Definitions:

Each record consists of an identification or header portion followed by a variable number of data portions, each of which contains data for one atmospheric level. Note that the format stored in NCDC's archive provides return characters only at the end of each sounding, whereas the IGRA files available via FTP provide each identification and data record on a separate line. The archived format also uses a six-digit station number in which the first five digits correspond to the WMO number, and the last digit is zero, whereas the FTP format uses only a five digit WMO station number. This documentation provides specifications for the archived format. For details on the FTP format, see the relevant readme file at www1.ncdc.noaa.gov/pub/data/igra/readme.txt.

Identification Portion (25 Characters)

FIELD	1	2	3	4	5	6	7	8
ELEMENT	BEG REC	STN NUM	YEAR	MONTH	DAY	HOUR	RELSE TIME	NUM LEVELS
#CHARS	#	XXXXXX	XXXX	XX	XX	XX	XXXX	XXXX
REC. POS.	1	2-7	8-11	12-13	14-15	16-17	18-21	22-25

Position: 1
Element: BEG REC
Definition: BEGIN RECORD INDICATOR -- The "#" sign will indicate the beginning of each new record.

Position: 2-7
Element: STN NUM
Definition: STATION NUMBER -- The station number is the five-digit WMO number with a "0" appended as the sixth digit.
Range of values is 000000-999999.

Position: 8-11
Element: YEAR
Definition: YEAR -- The year expressed at the hour of observation (UTC).
Range of values is 1938 through the current year processed.

Position: 12-13
Element: MONTH
Definition: MONTH -- The month expressed at the hour of observation (UTC).
Range of values is 01-12.

Position: 14-15
Element: DAY
Definition: DAY -- The numeric day expressed at the hour of observation (UTC).
Range of values is 01-31.

Position: 16-17
Element: HOUR
Definition: HOUR -- The hour (24-hour clock) of observation (UTC). For many records after 1990, the hour of observation is the nearest whole hour to the time of release, H-30 to H+29 minutes. In other records, the hour of observation tends to be the nominal hour (e.g., 00 or 12 UTC) nearest to the release time.
Range of values is 00-23.

Position: 18-21
Element: RELSE TIME
Definition: TIME OF ACTUAL RELEASE -- The hour and minute UTC (24-hour clock) of the actual release time expressed as HHMM where HH = hour and MM = minutes. Missing is indicated by "9999".
Range of values is 0000-2359 and 9999.

Position: 22-25
Element: NUM LEVELS
Definition: NUMBER OF LEVELS -- This is the number of data levels found in the sounding.
Range of values is 1-9999, although most soundings have fewer than 200 levels.

Data Portion (36 Characters) Repeated Number of Levels (NUM LEVELS) Times

FIELD	1	2	3	4	5	6
ELEMENT	LEVEL TYPE 1	LEVEL TYPE 2	PRESS VALUE	PRESS FLAG	HEIGHT VALUE	HEIGHT FLAG
#CHARS	X	X	XXXXXX	X	XXXXX	X
REC. POS.	1	2	3-8	9	10-14	15

FIELD	7	8	9	10	11
ELEMENT	TEMP VALUE	TEMP FLAG	DPDP VALUE	WDIR VALUE	WSPD VALUE
#CHARS	XXXXX	X	XXXXX	XXXXX	XXXXX
REC. POS.	16-20	21	22-26	27-31	32-36

Position: 1
Element: LEVEL TYPE 1
Definition: LEVEL TYPE INDICATOR 1 -- Denotes the primary type of the current data level.
Range is 1-3 as follows:
1 = Mandatory/standard pressure level
2 = Significant thermodynamic level
3 = Wind level

Position: 2
Element: LEVEL TYPE 2
Definition: LEVEL TYPE INDICATOR 2 -- Denotes the secondary type of the current data level
Range of values is 0-2 as follows:
1 = Surface pressure level
2 = Tropopause level
0 = Other

Position: 3-8
Element: PRESS VALUE
Definition: PRESSURE VALUE -- Atmospheric pressure at the current level in pascals (0.01 millibars). Missing is indicated by "-9999".
Range of values is 10-110000 and -9999.

Position: 9
Element: PRESS FLAG
Definition: PRESSURE FLAG -- Indicates the level of quality control through which the associated pressure has passed. For details on the types of checks applied, see Durre et al. (2005).
Range of values is blank, A, and B as follows:
blank = Pressure past basic quality control checks (if value present); a blank is also used when the associated pressure value is missing or has been removed (i.e., the pressure value is -8888 or -9999).

A = Pressure passed gross climatology check.
B = Pressure passed advanced (45-day climatology) quality control checks.

Position: 10-14
Element: HEIGHT VALUE
Definition: HEIGHT VALUE -- Geopotential height of the current level in whole geopotential meters (MSL); below mean sea level heights are expressed as a negative number. Missing is indicated by "-9999". A value of "-8888" indicates that the height has been removed during the quality control process, yet other valuable data remain available at the current level.
Range is -1000 to 70000, -8888, and -9999.

Position: 15
Element: HEIGHT FLAG
Definition: HEIGHT FLAG -- Indicates the level of quality control through which the associated geopotential height has passed. For details on the types of checks applied, see Durre et al. (2005).
Range of values is blank, A, and B as follows:
blank = Height past basic quality control checks (if value present); a blank is also used when the associated geopotential height value is missing or has been removed (i.e., the height value is -8888 or -9999).
A = Height passed gross climatology check.
B = Height passed advanced (45-day climatology) quality control checks.

Position: 16-20
Element: TEMP VALUE
Definition: TEMPERATURE VALUE -- The air temperature at the current level in degrees and tenths Celsius. Missing is indicated by "-9999". A value of "-8888" indicates that the temperature has been removed during the quality control process, yet other valuable data remain available at the current level.
Range is -1200 to 700, -8888, and -9999.

Position: 21
Element: TEMP FLAG
Definition: TEMPERATURE FLAG -- Indicates the level of quality control through which the associated temperature has passed. For details on the types of checks applied, see Durre et al. (2005).
Range of values is blank, A, and B as follows:
blank = Temperature past basic quality control checks (if value present); a blank is also used when the associated temperature value is missing or has been removed (i.e., the temperature value is -8888 or -9999).
A = Temperature passed gross climatology check.
B = Temperature passed advanced (45-day climatology and vertical/temporal consistency) quality control checks.

Position: 22-26
Element: DPDP VALUE
Definition: DEW-POINT DEPRESSION -- The dew-point depression at the current level in tenths of degrees Celsius. Missing is indicated by "-9999". A value of "-8888" indicates that the dew-point depression has been removed during the quality control process, yet other valuable data remain available at the current level.

Range of values is 0-700.

Position: 27-31
Element: WDIR VALUE
Definition: WIND DIRECTION -- Direction of the wind at the current level in whole degrees (nearest five degrees for observations received through GTS). Missing is indicated by "-9999". A value of "-8888" indicates that the wind direction has been removed during the quality control process, yet other valuable data remain available at the current level.
Range of values is 0-360, -8888, and -9999. (Direction is 0 when wind is calm.)

Position: 32-36
Element: WSPD VALUE
Definition: WIND SPEED -- Speed of the wind in meters per second and tenths. Missing is indicated by "-9999". A value of "-8888" indicates that the wind speed has been removed during the quality control process, yet other valuable data remain available at the current level.
Range of values is 0-1500, -8888, and -9999.

---

3. Start Date: 19389999.

4. Stop Date: Ongoing.

5. Coverage: Global.

a. Southernmost Latitude: 90S
b. Northernmost Latitude: 90N
c. Westernmost Longitude: 180W
d. Easternmost Longitude: 180E

6. How to Order Data:

Data are available at www.ncdc.noaa.gov. For information on receiving these data in other media, contact NCDC's Climate Services.
Phone: 828-271-4800
FAX: 828-271-4876
E-mail: **NCDC.Orders@noaa.gov**

7. Archiving Data Center:

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, NC 28801-5001
Phone: 828-271-4800

8. Technical Contact:

Imke Durre
Climate Analysis Branch
National Climatic Data Center
Federal Building
151 Patton Avenue

Asheville, NC 28801-5001
Phone: 828-271-4800

9. Known Uncorrected Problems: The following data problems have come to our attention and will be addressed during future enhancements of the IGRA quality-control system:

a. Geopotential heights prior to 1950 at some Russian stations were expressed in geometric meters rather than geopotential meters in the relevant source dataset (DSI-6310).

b. At certain stations during certain months, wind speed may be incorrectly reported in knots or in hundredths of meters per second.

c. The level indicators identifying tropopause levels should be used with caution since these identifications have not been quality-controlled, but occasionally have suspicious characteristics. For example, there are cases in which levels in the lower troposphere or middle to upper stratosphere are identified as tropopause levels.

For the most up-to-date information on the status of the dataset, see the status report at www1.ncdc.noaa.gov/pub/data/igra/status.txt.

10. Quality Statement:

The IGRA quality assurance system consists of a series of specialized algorithms that are applied successively. The procedures can be grouped into seven general categories: fundamental “sanity” checks, checks on the plausibility and temporal consistency of surface elevation, internal consistency checks, checks for the repetition of values, climatologically-based checks, checks on the vertical and temporal consistency of temperature, and data completeness checks (Durre et al. 2005). Each successive check makes a binary decision on the quality of a value, level, or sounding; either the data item passes the check and remains available, or it is identified as erroneous and thus set to missing. Although all variables are quality-assured, temperature, pressure, and geopotential height receive somewhat greater scrutiny than the other variables.

11. Essential Companion Datasets: Monthly means computed from IGRA are available in DSI-6352.

12. References:

Durre, I., R. S. Vose, and D. B. Wuertz, 2006: Overview of the Integrated Global Radiosonde Archive. *Journal of Climate*, 19, 53-68.